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ANNUAL FLOWERING PLANTS.

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U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF PLANT INDUSTRY,
OFFICE OF THE CHIEF,
Washington, D. C., March 17, 1904.

SIR: I have the honor to transmit herewith a paper relating to the cultivation and uses of annual flowering plants, prepared by Prof. L. C. Corbett, Horticulturist of this Bureau, and recommend that it be published as a Farmers' Bulletin.

Respectfully,

B. T. GALLOWAY,
Chief of Bureau.

Hon. JAMES WILSON,
Secretary of Agriculture.

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ANNUAL FLOWERING PLANTS.

INTRODUCTION.

The more fully the observer is familiar with the functions of plants and the structure and purpose of their leaves and flowers the more fully and completely will he appreciate and interpret their beauty and the refined sentiments they represent.

Plants are the missionaries of nature constantly at work attempting to cover some ugly scar which civilized man has made in his struggle to wrest from the earth the living which he claims she owes him. If you will but give nature the suggestion of your wishes in the form of a few choice seeds she will paint for you the rich shades of the pansy or the phlox; she will carpet your floor with a velvet rug of green and strew upon its surface in bold contrast the golden disks of the dandelion or the bright, saucy faces of the crocus. She will drape your walls with a festoon of green and hide therein rich gems of purple, of crimson, and of white, and, if you ask it, she will screen one apartment from another with barriers of green which may or may not carry bright floral gems.

While flowers are primarily utilitarian in purpose, the end is attained by attractive and alluring means. The beauty, fragrance, and sweetness of the flower are not vain attributes; each is designed for a subtle purpose. The bright colors are the gala-day attire of these natural fairies to attract and allure the passer by, be he insect, bird, or man. The perfume wafted upon the still night air suggests the whereabouts of the fragrant night-blooming flowers to moths and other night-flying insects, while the cups of honey at the base of the petals hold a reward for those who have heeded the signal of the color or the odor. The pot of nectar is a sufficient reward for the insect, and the transfer of pollen from anther to stigma by the clumsy but welcome guest is the end for which all this beauty, fragrance, and sweetness have been produced.

Beautiful plants and flowers naturally grouped are pleasing because they are restful. Association with nature is soothing because the crudities of man's invention in which friction is such a large factor are all eliminated. The sounds in the woods are musical, harmonious, and rhythmical, soothing and pleasing in effect, while the colors are beautifully blended, holding the eye and the attention without effort and without fatigue. Nature in such moods is restful.

TREATMENT OF SMALL PLACES.

While man can not call in upon a small place these larger and broader expressions of nature, he can pleasingly use a limited number of the factors which go to make up this final result for the purpose of adding beauty to his abiding place. Trees may be used to give protection from wind and sun. The varieties may be so chosen as to give expressions of pleasure, of restfulness, of sprightliness, or of sorrow. Trees have all these expressions, and they influence to a great degree the lives and characters of the persons who daily go among them. It therefore behooves us in selecting trees for the adornment of our home grounds to choose those with pleasant and elevating rather than those with somber and depressing expressions.

While trees must be relied upon as the general structural or framework parts in the adornment of a place, shrubs, grass, and annual flowering plants make up the detail. And it is the detail which gives finish and completeness to the place as a whole. It frequently happens that in attempting to recall a particular building, room, or painting some one detail may serve to give the mind a clew to the whole. The general plan or outline may be lost and a single factor of the finish serve to identify the whole; hence the importance of these finishing factors.

Shrubs are important and satisfactory, because when once established in their proper relations to one another and to the general scheme of improvement each year adds to their beauty and their value. Not so with the annual planting. It is the one factor through which novelty and variety may be introduced. Trees and shrubs may be considered fixtures, while annual plants serve as pictures which may be shifted from season to season to suit the pleasure of the occupant of the dwelling whose grounds they beautify. Annual plants, too, are the only form of embellishment which a tenant will ever care to bestow upon a place. Such plants give quick returns and large profits from a small outlay of time and labor.

The range of size and the variety of foliage and of bloom afforded in the list of annual plants which can be successfully grown from seeds each year is sufficient to enable one to quite successfully secure by their use temporary effects which it would take many years to obtain from shrubs. While no one should feel content with this form of emergency planting, new places and temporary locations can be greatly softened and beautified by a judicious use of these annual plants.

USE OF PLANTS ABOUT A DWELLING.

Annual plants which have a suitable habit of growth and adequate foliage may be made to do duty about the dwelling and upon the grounds in the place of the more appropriate shrubs and perennials.

The one great drawback to which such annual plantations are subjected is their yearly destruction by the first hard frosts of the season. Annual plants, such as cosmos, castor bean, sunflower, aster, zinnia, and flowering sage, may all be made to serve as substitutes for shrubby plantations until the shrubs themselves have grown to sufficient size to command the situation.

Tall-growing, broad-leaved plants, like the castor bean, can be used with advantage as screens for driveways or walks by placing a mass of the plants in the bay of the walk or drive. The tall-growing plants of this description when massed against buildings, fences, or other obtrusive objects serve as attractive and efficient temporary screens. Lower-growing plants when massed in borders along the boundary of the place, with taller-growing annuals or shrubs as a background, are more effective than when used in beds at the front or side of a dwelling. In fact, the formal bed, either in the shape of an oval, circle, or star, in the center of a greensward, is generally more obtrusive than pleasing. The next best place for the annuals after the border is in masses about the foundation of a building; and if vines of a temporary nature are desired, some of the rapid-growing sorts, such as *Cobæa scandens*, the moonflower, morning-glory, or cypress vine, may be appropriately used for training over fences or walls, or about porches.

When annual plants are desired for the bloom which they produce for use as cut flowers, the best disposition of them is to plant them in an area set apart for a flower garden or to devote a portion of the vegetable garden proper to the purpose. When grown for cut bloom merely, the most satisfactory and economical plan is to plant them in long rows, with ample space both between the rows and the individuals in the row. Unless the plants are given sufficient room for full development the flowers which they produce will be inferior in size and form. To secure the best results from plants to be used in this way rich soil, ample space, and good culture are essential. While it is advantageous to sow the seed thickly at planting time in order to insure a good stand of plants, it is equally desirable to have the plants thoroughly thinned so as to provide ample space for their full development.

If the flower garden is a distinct feature of the place and its mission is to furnish an attractive retreat, as well as cut flowers, its general plan may be more pretentious; the straight rows may give place to irregular groups or masses, or even to formal beds and designs, so long as these are not made the leading feature in the general adornment of the place. In fact, curved pathways in the flower garden allow an opportunity for demonstrating the fitness of certain plants for special purposes. The bays of the curves can be filled with tall-

growing, dense-foliaged plants for the purpose of hiding the beds or groups which lie farther on. Curved walks are more pleasing than straight ones, and lend themselves more kindly to the needs of the different classes of plants which find a place in the home flower garden. If the flower garden is to be a permanent feature of the adornment of a place, the walks may be arranged to conform to the contour of the land, or if level may be given some geometrical character or design and made permanent by the use of gravel and grass borders.

If a fixed design is to be adopted, the soil in various areas of the

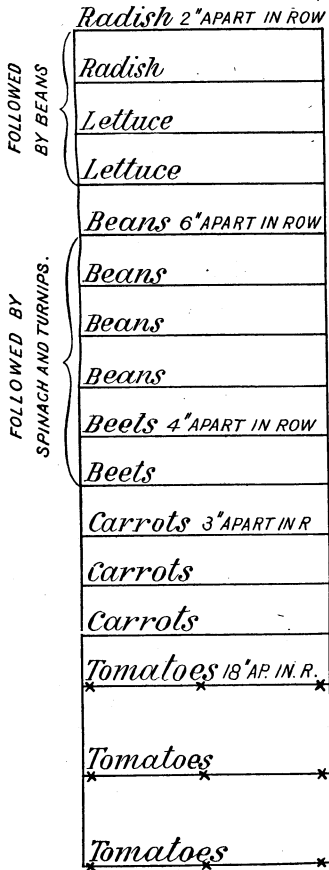


FIG. 1.—Plan of a vegetable school garden.

garden may be modified by the addition of sand, muck, or clay, and by the use of plant foods to suit these particular areas to the needs of special plants. Those which enjoy a dry, sandy soil can be provided for, while those which thrive best in a heavy soil can also be accommodated. If, on the other hand, a less formal and fixed character in the garden seems desirable, the whole area may be annually spaded or plowed up, the walks given a new course, and the general scheme of planting changed. Such an arrangement will give variety and novelty to the garden, and for most purposes will prove quite as successful as the more formal arrangement. During wet periods, unless the soil is of a sandy character, the lack of graveled walks will prove a disadvantage.

SCHOOL GARDENS.

The cultural suggestions contained in this bulletin may be found of advantage to those engaged in school-garden work. It is suggested, however, that for use in school gardens plants with a low, bush type of growth be selected rather than those which are tall, broad-leaved, or of a climbing habit, particularly when the plants are to be used in small individual gardens. Tall-growing, broad-leaved plants are appropriate for use in a scheme for the general improvement and decoration of the grounds, but they are not well suited for individual gardens. In most cases the allotment of ground to each individual must be small, not more than 5 by 10 or 15 feet.

In order, therefore, to allow the individual a variety of plants it is absolutely necessary that they be of compact habit and adapted to close planting. A single well-grown castor bean would entirely cover the area above-mentioned. Such plants are therefore excluded from the individual school garden on account of their size. The verbena, phlox, petunia, aster, zinnia, portulaca, larkspur, pot marigold, and dwarf nasturtium are, however, well suited for the small areas of the individual garden.

Plan of a school garden.—The individual garden when used for flowers will admit of little opportunity for rotation or succession among the crops in any one season unless bulbs be introduced for fall planting and early spring bloom. If this plan is followed, a cold frame or window box will become almost a necessity, because the blooming season of the bulbs will not be over at the time when, for best results, some of the most desirable of our garden annuals should be planted in the open. For most complete returns from the area at one's command this method of using bulbs in the autumn, followed by hotbed or cold-frame grown plants for spring planting, is advised. For it should be the aim not only to interest children in plants, but to teach them how to make the most out of a given area. The rule of keeping a crop constantly upon the ground is as important in the management of decorative as it is in purely commercial plantations.

Form of a school garden.—The rectangular form is undoubtedly most satisfactory for an individual school garden. It is most economical of space and if the gardens are not more than 5 feet wide the rows can be planted crosswise of the area and all cultivation given by the student from the walks and alleys without tramping upon the soil of the garden proper. The plan of a garden 5 feet wide and $16\frac{1}{2}$ feet long is shown in fig. 1, and a satisfactory collection of plants is enumerated. If, as is desired in most cases, the flower garden and the vegetable garden are to be combined, an arrangement such as is indicated in fig. 2 can be substituted.

Followed by Tomatoes	<i>Radish</i> 2' APART IN ROW
	<i>Radish</i>
	<i>Lettuce</i> 6' APART IN ROW
	<i>Lettuce</i>
	<i>Beans</i> 6' APART IN ROW
	<i>Beans</i>
	<i>Beets</i> 4' APART IN ROW
	<i>Beets</i>
	<i>Carrots</i> 3' APART IN ROW
	<i>Pot Marigold</i> 1' APART IN ROW
	<i>Pot Marigold</i>
	<i>Nasturtium</i> 6' APART IN ROW
	<i>Petunia</i> 6' APART IN ROW
	<i>Phlox</i> 4' APART IN ROW
	<i>Phlox</i>
	<i>Verbena</i> 6' APART IN ROW
	<i>Candytuft</i> 3' APART IN ROW
	<i>Portulaca</i> 4' APART IN ROW

FIG. 2.—Plan of a combined vegetable and flower school garden.

GENERAL CULTURAL SUGGESTIONS.

The dates for planting the seed of each of the varieties enumerated in this publication, as well as the particular requirements in their cultivation, are stated in the discussion of each species. General cultural directions, for convenience and economy of space, are brought together here.

Seed sowing.—All of the crops mentioned can be propagated from seed. In some cases, however, the seeds require special care in order to insure a good stand of plants, and it is for that reason that the special devices needed for that purpose are described.

Germination.—The germination of seeds depends upon a proper degree of heat, moisture, and air (oxygen). All three of these conditions must be present in normal proportions with each of the others in order to insure the best germination of the seed. Some seeds germinate best under a maximum degree of heat (80° to 90° F.) while others do best at a low temperature (40° to 60° F.). For most seeds, however, a soil temperature a few degrees higher than that of the surrounding air is desirable. A soil temperature of from 65° to 70° F. for an air temperature of 60° F. will prove very satisfactory for the germination of most seeds. It will be difficult to secure these conditions, however, without artificial means, such as a greenhouse, hotbed, or cold frame. Strange as it may seem, nature maintains conditions during the early part of the growing season approximating those above specified.^a

Moisture.—Seed in a majority of cases grow best when the moisture in the soil is slight rather than when present in excess. A good test for moisture is to take a handful of soil and compact it gently in the palm of the hand by closing the fingers. If when released the soil remains solid and retains the impressions of the hand, it is too wet; but if when released it springs back and slowly crumbles or parts, it is in ideal condition for seed sowing. Such soil is well aerated, while the soil containing an excess of moisture has the air largely replaced by water.

The seed bed should be carefully guarded against extremes of moisture. It should not be allowed to get too wet and remain in that condition for any length of time, neither should it be allowed to get too dry. In the open these conditions are not likely to occur during a normal season. However, there are frequent exceptions. If too wet, little can be done to overcome the bad results, but if drought occurs irrigation will remedy the evil. Under artificial conditions, such as obtain in a greenhouse, hotbed, or cold frame, the moisture content of the soil of the seed bed can be very carefully controlled. The con-

^aSee soil temperature records, New York State Experiment Station.

finer atmosphere of such a structure prevents rapid or excessive evaporation, while any loss of moisture from the soil can be made good by watering. On a small scale the same results can be approached by placing a pane of glass over the receptacle in which the seeds are sown.

Soil temperature.—Slight variations in the temperature of the soil in which seeds are sown are usually a benefit rather than a hindrance to germination. With the grasses and clovers germination is more rapid and more complete in seeds subjected to alternations of temperature than in those kept under constant temperatures. This applies to practically all seeds. Under normal conditions the warming of the soil during the day and the cooling at night furnish sufficiently wide variations. While these variations are less easily controlled than are the variations in moisture, yet in structures such as hotbeds and cold frames the change from day to night temperature will be perceptible.

Seeds in order to germinate promptly must be placed under conditions which will enable them to take up moisture readily and at the same time they must have a temperature which will be congenial to the young plant when it appears. The soil is the medium by which heat and moisture are, under normal conditions, transferred to the seed. In order to insure a quick exchange of moisture from the soil to the seed the soil should be carefully firmed or compacted about the seed. By compacting the soil about the seed the capillary power of the soil is increased and as the seed becomes an intimate part of the soil the soil moisture is thus more quickly brought to the seed. In outdoor operations large seeds may have the soil compacted about them by tramping the row with the feet, while fine seeds may be treated by resting a board over the row and walking upon it from end to end. In hotbeds, greenhouses, and cold frames the compacting of the soil is usually accomplished by the use of a float, which consists of a piece of board about 6 inches wide and 9 or 10 inches long, with a handle attached, as shown in fig. 3.

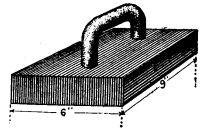


FIG. 3.—A float for firming the soil.

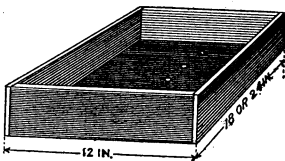


FIG. 4.—A flat.

For all conditions save in the open, seeds may be sown in seed pans or in flats, such as shown in fig. 4. These boxes can be very conveniently and cheaply made from the pine boxes largely used for packing canned goods, soaps, etc., usually 9 or 10 inches deep, which is sufficient to allow of cutting them with a rip-saw into three sections each about 3 inches high. The top and bottom of the box will each make a complete flat, while the middle section will be a frame which can be provided

with a bottom by the destruction of a box for each three sections. Seeds may also be planted directly in the soil of the hotbed, cold frame, or in that upon the greenhouse bench. They may be sown broadcast or, preferably, in rows.

In covering seeds the rule under artificial conditions is to bury the seed to the depth of its greatest diameter. In outdoor culture, however, this is not the practice; seeds are usually covered about three to five times their diameter. With seeds the size of a grain of wheat it is, in general, safe to plant them 1 inch deep, and for those the size of beans 2 inches deep. Small seeds like those of petunia, tobacco, etc., should be scattered over the surface and the soil compacted with a float.

Transplanting.—The young seedling plants which are to be grown for their bloom should, as soon as the first true leaves are formed, be transplanted so that they will stand at some distance from one another. For small, rather slow-growing, plants, such as pansies, 1 inch apart each way will afford ample room, but with most plants 2 inches each way will be best, while with robust-growing plants, like the castor bean, 4 inches will not be too much. With such plants, however, it is best to place the seeds directly in pots or cans in order to prevent disturbing the roots of the young seedlings and to afford them ample space. Transplanting has a tendency to make the plants stocky and affords opportunity for the development of an extensive root system.

The pleasure derived from floral decorations depends not only upon the perfection of the flowers, but upon having a continuous display throughout the season. With most of the garden annuals early bloom can not be secured if seed sowing in the open must be relied upon exclusively. Fortunately the gardener's art has devised cheap and efficient means for, as it were, anticipating nature. By the use of cold frames at the South and hotbeds at the North the season can be advanced several weeks. In the latitude of Washington, D. C., the period of growth can be advanced from the normal date of seed sowing in the open—May 1—to March 1, or a gain of two months. Seed sown in a gentle hotbed at this date will give plants which, if properly handled, will forward the season of bloom as many weeks.

HOTBEDS.

Hotbeds are usually constructed in one or the other of the following ways:

Temporary hotbeds.—A temporary hotbed may be made by using fermenting stable manure, preferably that with a small amount of straw or litter in it, from grain-fed horses. The manure may be

placed in a broad, flat heap and thoroughly compacted by tramping. A heap 8 or 9 feet wide and any multiple of 3 feet in length, with the manure 14 to 16 inches deep, will give sufficient heat for the latitude of New York City. Farther north the heap should be made deeper and broader. Upon the surface of the manure heap, a frame made 8 inches high at the front and 12 inches high at the back, with tapered boards for ends, will give sufficient fall to the sash to carry off the water and will afford ample space for the development of the plants within. When completed, a surface hotbed will appear as shown in fig. 5. A

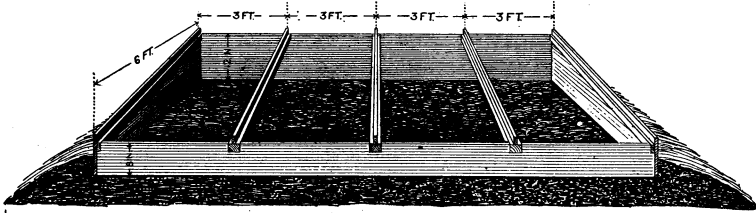


FIG. 5.—Frame to carry the sash of a hotbed or cold frame.

cross section is illustrated by fig. 6. If severe weather is likely to occur during the time the hotbed is in use, the frame should be banked with manure to give additional heat and protection. After placing the frame upon the manure heap, about 3 inches of good garden loam should be scattered uniformly over the area inclosed by the frame. Place the sash in position immediately and allow the bed to heat up. Do not plant any seeds in the bed until the temperature begins to subside, which will be in about three days after the sash are put in place.

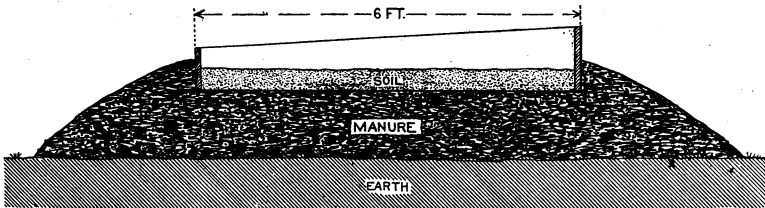


FIG. 6.—Cross section of a temporary hotbed.

When the temperature has fallen to 85° or 90° F. planting may be safely begun.

Permanent hotbeds.—A permanent hotbed may be so constructed as to be heated either with fermenting manure or by radiating pipes from the dwelling or greenhouse heating plant. For a permanent bed in which manure is to supply the heat a pit 2 to $2\frac{1}{2}$ feet in depth, according to the latitude in which the work is to be done, should be provided. The sides and ends may be supported by a lining of plank supported

by posts 4 feet apart, or, what is better still, a brick wall 9 inches thick, as shown in fig 7, may be used. In either case the pit lining should come flush with the surface of the soil. The site for the pit should be on naturally well-drained land, and a tile drain from the bottom of the excavation should be provided to prevent water from accumulating in the pit and stopping the fermentation of the manure during the period the hotbed is in use.

Standard hotbed sash are 3 by 6 feet in size. The pit, therefore, should be some multiple of 3 feet in length and the width should be the same as the length of the sash—6 feet. The plank frame or the brickwork of the pit may be extended above the surface of the ground sufficiently to allow for placing the sash immediately upon these permanent structures, or a frame such as is described in connection with the construction of a temporary hotbed (fig. 5) may be used. In the autumn

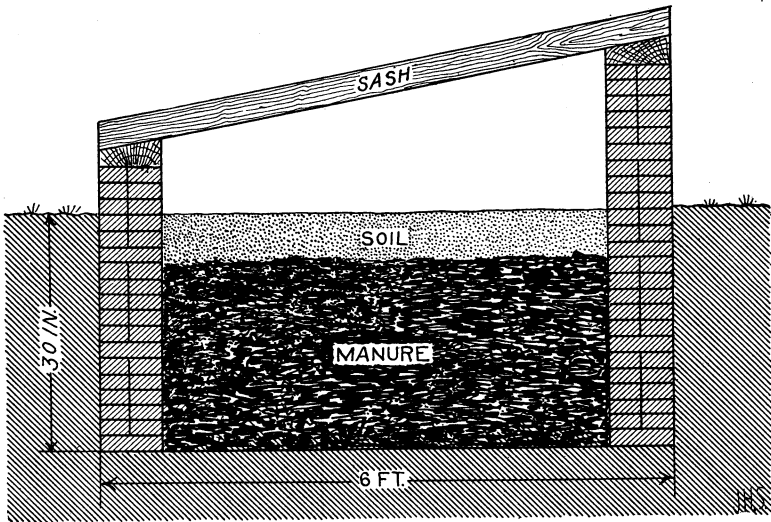


FIG. 7.—Cross section of a permanent hotbed or pit.

the pit should be filled with leaves or straw and covered with loose boards or shutters to prevent it from becoming filled with snow and ice and in order that it may be ready for use early in March.

Sash.—Hotbed sash should be constructed of white pine or of cypress, and the sash bars should run in one direction only and that lengthwise of the sash. The bars may be braced through the middle by a transverse bar placed through the long bars below the plane occupied by the glass. The two ends of the sash should be made of sound timber, 3 inches wide at the top and 4 inches wide at the bottom end, mortised to receive the ends of the sash bars, and with a tenon at the ends to pass through the side pieces, which should be $2\frac{1}{2}$ inches wide.

Glazing.—Placing the glass in hotbed sash is one of the most important operations in the construction of a hotbed and is also one of the factors which largely determines the success or failure of the hotbed. The glass should be bedded in putty, i. e., the rabbet in the sash bar which is made to carry the glass should be filled with soft putty, and the glass, crowning side up, pressed firmly into the bed of putty and securely fastened with shoe nails or wire brads. Glazing points are not sufficiently secure. The first glass to be placed in any frame is a bottom light, i. e., the pane nearest to the front or lowest side of the hotbed when the sash is in place. The next light should be bedded in the same manner as the first and so placed as to lap about three-sixteenths of an inch over the top edge of the one first placed, like shingles on a roof. Brads should be driven below the lower corners of the second pane in order to prevent it from slipping down over the under one. The same method of procedure should be continued until the frame is filled with glass.

Size of glass.—While a frame with two courses of glass will admit a little more light than one with three, the breakage is somewhat less with small glass and the cost of repairing correspondingly less, and for these reasons the three-course frame is more desirable. Nowadays many hotbed sash are made with a groove or slot into which the glass may be slipped and fastened at the bottom by brads to prevent them from slipping out. Grooved sash have the commendable feature of being cheaply and quickly glazed, but as the glass can not be lapped and as no putty is used the sash are not water-tight and do not furnish as good protection from the wind as sash in which the glass is bedded in putty.

Care of a hotbed.—At the North, in addition to the glazed sash, board shutters, straw mats, or mats of burlap or carpet will be needed as an additional protection during cold nights. During bright days, even when the temperature outside is near the freezing point, it will be necessary to lift the sash a little at the high side of the frame to allow the hot air to escape and prevent injury to the young plants.

Watering.—Hotbeds should be watered in the morning only, and then only on bright days. Watering at night is dangerous, as the operation necessitates the lifting of the sash and the loss of the accumulated heated air, and the water itself lowers the temperature of the soil so that in cold weather there is greatly increased danger to the plants from frost. Then, too, the excessive moisture resulting from dampening the leaves and confining them during the night provides congenial conditions for the development of mildew and the damping-off fungus.

COLD FRAMES.

Cold frames are devices intended to protect plants from cold, without forcing them into growth. They differ from hotbeds in that no artificial means of heating are employed. The cold frame in its simplest form consists of a frame constructed like the one described in the chapter on hotbeds and illustrated in fig. 5. The back board is usually 12 inches and the front 8 inches wide, and the two are connected by a tapered board 12 inches wide at one end, 8 inches wide at the other, and 6 feet in length. The back and front of the frame are made in multiples of 3 feet in length, with an inch added for each division space between sash, which is provided for by the use of a T-shaped piece let into the frame to stiffen it and serve as a guide for the sash. The manner of making the guide, as well as its appearance when in place, is shown in fig. 5. When complete, the frame is placed upon a sheltered, well-drained piece of ground convenient to some main line of traffic between the house and some other important and frequently visited portion of the grounds. The frame, as above stated, is made to carry hotbed sash. The glass allows the sun during bright days to temper the air of the frames, so that by properly covering them at night with shutters, straw, or jute mats the heat can be retained and the plants within safely carried through severe weather. The frames may be banked with earth as an added precaution against cold.

Care of cold frames.—The chief precaution which must be observed in the management of a cold frame is that of proper ventilation. The object of this device is to retain plants in a healthy condition without adding to their growth. It is therefore very essential that the temperature of the frame at all times be kept at a degree which will not induce rapid growth. High temperatures and abundant humidity induce growth. The management of the frame should be so directed that during bright, sunny weather the sash may be lifted sufficiently to admit outside air in order to preserve a low temperature about the leaves of the plants. In some cases it will be found that during bright days even in midwinter the sash will have to be removed from the frame for a few hours at midday in order to preserve a sufficiently low temperature. On the other hand, care should be exercised in ventilation and watering so as not to reduce the temperature of the frame late in the afternoon, as such treatment is liable to lead to frost injury.

Plants for cold frames.—It stands to reason that only the hardiest plants can safely be carried over winter in a cold frame. Many of the plants which are grown as annuals will, with protection, become perennials, or can be made to give a much longer period of bloom if sown

in the autumn and carried over winter in a cold frame. Among plants which will be greatly benefited by such treatment are pansies, dianthus, and chrysanthemums.

PITS.

The pit is a more elaborate and efficient cold frame which, as its name indicates, consists of an excavation. This excavation may be from 2 to 4 feet in depth, with sides protected by plank or brick walls, as shown in fig. 7, upon which a frame similar to the one described for the cold frame is placed and covered with sash. The pit has an advantage over the cold frame for some purposes. It can be used, for instance, to store some of the hardier flowering plants which are to be placed in tubs or vases about the lawn during summer. Plants in a pit are protected by the warmth of the soil. In latitudes where the pit will be found of greatest use the soil does not freeze to a depth of more than 10 to 15 inches. Seedling plants may be held over winter in trays or flats in pits as safely as in frames.

Management.—The same precautions in regard to ventilation, covering, and watering must be observed in the care of a pit as in the case of a cold frame.

THE CULTIVATION AND USES OF ANNUAL FLOWERING PLANTS.

AGERATUM.

“For strengthening the garden’s color forces in blue, no annual is so good as the *ageratum*.” Though ordinarily used in bedding and borders in contrast with such plants as geraniums, perillas, amaranthus, etc., the rose, white, and blue *ageratums* are exceedingly attractive when mingled with alyssum, candytuft, and similar plants. They grow well upon almost all soils and through a wide range of climate; for that reason many combinations with them are possible. The plants are neat, bushy, and erect, with a continual profuse clustering of pretty brushlike flowers throughout the season. The dwarf blue



FIG. 8.—*Ageratum*.

sorts make fine borders and are much used where contrasting color effects are desired. For early bloom the seed should be sown in cold frames or in boxes in the house early in the season—March—but for summer and fall bloom the seeds may be sown in well prepared beds in the open. Seeds sown in August will produce good plants for winter flowering.

ALTHÆA ROSEA. (See **HOLLYHOCK.**)**ALYSSUM.**

For borders, edgings, baskets, pots, rockwork, and for cutting, a liberal use of this dainty little flower is recommended. For borders, the seed should be sown thickly so as to form masses. For winter bloom, sow late in August and thin the seedlings so as to stand about 4 inches apart, but for spring bloom or for borders the seeds should be sown in the open early in the spring, or even late in the preceding autumn in some localities. Where the plant will not endure the winter, however, early spring planting under cover, either in a cold frame or spent hotbed, or in boxes in a dwelling, is most to be relied upon. Alyssum can also be increased from cuttings made from strong new side shoots,

as well as by division of the roots. By cutting back after the first flowers fade others will be produced. While white is the most common and popular color, there are yellow varieties of alyssum.



FIG. 9.—Alyssum.

ANTIRRHINUM. (See **SNAPDRAGON.**)**AQUILEGIA.** (See **COLUMBINE.**)**ASTER.**

The aster is certainly one of the most satisfactory of the annual flowering plants. The great variety in its size, color, form, and season of blooming makes it a most satisfactory plant for supplying cut flowers. In fact, many of the improved sorts produce flowers equal in form and size to some of the better sorts of chrysanthemums. The range of color presented in this group is one of its chief merits. Strange as it may appear, the plant world is not very well supplied with blue flowers possessing characters which render them suited to domestic or commercial uses. In the aster, however, are found many shades of blue and purple and for this reason, if for no other, the aster should prove an attractive decorative plant. The habit of growth adapts the aster not only to close planting for cut bloom, but some



FIG. 10.—Aster.

forms are robust, tall-growing plants, well adapted for use in an herbaceous border where late bloom and careless effects are desired. The more compact-growing, large-flowered forms are most desirable for cut blooms, while the tall-growing, open types are most useful in wild gardens or for screens. The wild aster (*Aster novæ-angliæ*) is one of the most beautiful and most satisfactory of this latter class. The vigor and ease of culture of the aster are factors which contribute to its popularity.

Plants from seed sown in the open ground in May bloom finely in September and October, when the flowers are seen at their best. For July and August bloom, seeds should be sown in March or April in a cold frame, spent hotbed, or in pots or boxes in a living room. Cover the seeds about half an inch deep with rich, light soil and when the plants have three or four leaves transfer them to thumb pots or to other boxes, setting the plants about 2 inches apart each way. After all danger of frost is past transplant the plants so treated to their permanent home, where they should stand about 18 inches apart each way in well-prepared beds. Fresh manure or manure used in too large quantities sometimes proves injurious to asters. Only thoroughly composted manure mixed with the soil is safe for these plants. Small quantities of air-slaked lime, or of fresh wood ashes, stirred into the surface of the aster beds prove beneficial to the plants. When given plenty of water and rich, fine soil asters can be grown into beautiful pot plants.

In some localities and during some seasons the aster is seriously attacked by the so-called black potato beetle or blister beetle (*Epicauta pennsylvanica*), an insect which feeds upon the partly developed buds, causing them to develop, if at all, into deformed, irregular blossoms. In such localities asters can be successfully grown under screens of mosquito netting or other thin cloth.

BALSAM (*Impatiens balsamina*).

A native of India, the garden balsam loves a hot sun, rich soil, and plenty of water. The young plants are quick, sure growers, and from seed sown in the open ground in May soon form handsome bushes thickly massed with large, rose-like flowers. Transplanting two or three times has a tendency to dwarf the plants into better shape and to make the flowers



FIG. 11.—Balsam.

more double. Balsams are not often given room for perfect development; they will easily cover 12 to 18 inches of space each way. For the finest flowers choice seed is more than usually essential, for cultivation and selection have wrought wonders with this plant. The one objection to the balsam is its habit of producing its flowers, as it were, on the underside of the leaves, or inside the plant. While the individual flowers are beautiful, the obscure manner in which they are borne detracts considerably from the value of the plants. When used at the margin of groups or to crown a terrace they are shown at best advantage.

For early bloom the seeds should be sown about the middle of March in a gentle hotbed or in the dwelling house. As soon as the first true leaves have developed the young plants should be transplanted to thumb pots or to boxes where they will stand about 2 inches apart each way. An abundance of light and water is at all times necessary for success with these plants. Care should be exercised to prevent them from becoming drawn, as stocky, symmetrical plants produce the best flowers.

CALENDULA or POT MARIGOLD.

The calendula or pot marigold is a hardy annual about a foot high. A moderately rich, light soil is most congenial to these plants, which should be placed about 8 or 10 inches apart, if planted in mass or in borders. The seed may be sown in the open ground quite early in spring, and the plants will be in bloom early in summer and continue to bloom until late in the autumn. The coloring of the flowers ranges through all shades of yellow from ivory to deep orange. The plants bloom freely and earlier than the marigold, and are useful in beds, borders, or backgrounds. The dried flowers are sometimes used for



FIG. 12.—Calendula.

flavoring soups and stews. There are both single and double forms of the pot marigold. One of the most satisfactory methods of propagating this plant is from seeds sown about April 1 in the North in spent hotbeds or cold frames. After the middle of May, in localities north of Washington it will be safe to transfer the young plants to their permanent summer quarters.

CALIFORNIA POPPY (*Eschscholtzia*).

The *eschscholtzia* is the State flower of California, and an annual of striking character both as regards the form and color of its flowers, which are bright and rich in their tints of yellow and orange. The plants average about a foot in height, have attractive silvery foliage, and produce their large poppy-like flowers quite lavishly from early spring until frost. They are most effective when grown in beds of considerable size, over which the seed may be thinly sown broadcast and lightly raked in. These sowings may be made early in spring, or late in autumn for earlier germination and bloom the next spring. The *eschscholtzia* is also very useful as a pot plant and for cut flowers.



FIG. 13.—California poppy.

CALLIOPSIS (*Coreopsis*).

Coreopsis is a genus of showy annual or perennial herbaceous plants, with graceful long-stemmed flowers well suited for bouquets. The hardy annuals of this genus are generally known by the name *calliopsis*. This is one of the garden's great forces in yellows, strengthened with rich maroons and browns. Seeds of the *calliopsis* for summer flowering in situations north of New York City should be sown in March in boxes in a living room or in a gentle heat in a greenhouse or hotbed. In localities south of New York the seeds may be sown in the open in May in good garden soil, with the hope of an abundance of flowers from August until frost. The plants should be thinned or transplanted to at least 10 inches apart each way. Their tall, slender habit makes neat staking and tying necessary. All are fine for cutting, especially *Coreopsis grandiflora* and *C. lanceolata*.



FIG. 14.—Calliopsis.

CAMPANULA (Canterbury Bells, Bell Flower, Slipperwort.)

Campanula is a genus comprising both perennial, biennial, and annual flowering plants. These fine old plants are rich in color, pro-

fuse in bloom, and of easy culture. For outdoor effects, when planted in quantity, they are glorious, and finest full-blown specimens of such varieties as *calycanthema* or Canterbury bells can be transplanted to pots for house decoration by soaking the soil about them with water and lifting with a ball of earth. The seeds of the annuals should be sown in April or early in May. The seeds of biennials should be sown outdoors early in July, and the plants may be thinned or transplanted to temporary quarters as late as October.



FIG. 15.—*Campanula*.

The old practice of covering Canterbury bells with leaves through the winter is not satisfactory. Transplant them 6 or 8 inches apart in a cold frame, where they will make large plants by spring and are as easily cared for as pansies. In the spring set them 18 to 20 inches apart in beds where they are to bloom. In June and July they flower most profusely, and are in fine form a long time. They also make beautiful pot plants for Easter. If sown early in good soil the hardy perennials will bloom early the next year. All varieties like a rich, sandy soil, with good drainage.

CANDYTUFT (*Iberis*).

The candytufts are among the best white flowers for edging beds, for planting in belts, beds, or massing, for rockeries, and for cutting. Several of the varieties are fragrant, and all are profuse bloomers. The seed should be sown outdoors in April where the plants are to bloom, and well thinned when they have grown about an inch high. Make a second planting a month later, and a third late in July for fall flowers. September sowings will give winter-blooming plants. The soil for best results should be rich, and the plants given an abundance of water. They branch freely, and if some are removed the flowers will be larger.

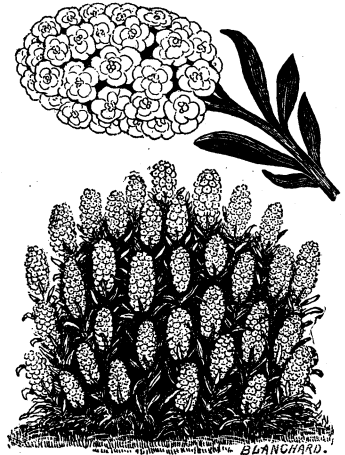


FIG. 16.—Candytuft.

CANTERBURY BELLS. (See **CAMPANULA**).

CARNATION. (See **PINKS**.)

CASTOR BEAN (*Ricinus*).

The castor-oil plant, commonly spoken of as the castor bean, is especially valuable because it is one of the few annuals which can be used to produce a semitropical effect. Its rapid growth and large size make it valuable as the central object in groups where rich, luxuriant growth is required. The variety of color in the foliage of the different sorts of castor bean is of value in giving contrast, and when used in combination with cannas, caladiums, coleus, or scarlet sage most striking effects of contrast can be produced. As a background for lower-growing plants the castor bean has no equal among garden annuals. Only the annual climbing vines, when provided with suitable supports, equal it as a low screen. It can be used with good effect in groups, as masses along shrubby borders, or as belts for covering and shutting out an undesirable view.

At the North, the castor bean is most satisfactory when started in March or early in April in a gentle heat. A hot-bed, greenhouse, or living room can be made use of for the purpose. As soon as the first true leaves have formed, the young plants should be pricked out into small boxes or pots, where they should be kept growing slowly until all danger of frost has passed, when they may be transferred to the open. After transplanting the young plants, it is desirable that they have sufficient room to prevent them from growing too tall and consequently from losing their lower leaves.

If planted in the open ground at the same time garden beans are planted, the castor bean will make a growth of from 4 to 6 feet by the middle of August. This plant loves a rich soil, plenty of moisture, full sunlight, and great heat. The varieties range in height from 3 to 10 feet and have leaves of corresponding size.



FIG. 17.—Castor bean.

CENTAUREA. (See CORN-FLOWER.)**CHRYSANTHEMUMS.**

The chrysanthemums, like the pinks, contain some of the most valuable of the commercial florists' products, both hardy perennial and annual flowering plants.

The large-flowered types of chrysanthemums, which each autumn

produce such gorgeous shows in the stores, florists' establishments, and conservatories, are not hardy, and since they are treated as greenhouse plants by the florists they are only mentioned in this list. The



FIG. 18.—Chrysanthemum.

class of hardy chrysanthemums, which should be more commonly seen in every flower garden, and which are known as pompons, are simply noted to give proper relation to the annual chrysanthemums which are the subject of this sketch.

These plants bloom most satisfactorily if the seeds are sown early in a hotbed or cold frame and the young plants transferred to the open as soon as the soil has become sufficiently warm to keep them growing without check. If started in a hotbed the young plants should stand 10 to 12 inches apart when set in their permanent locations. Somewhat less satisfactory results can be secured by sowing the seed about corn-planting time in the open where the plants are to bloom. The seedlings should be thinned to stand at least 8 inches apart. If the same care in regard to disbudding and pinching back is taken with the annual plants as with the large-flowered perennials the work will be rewarded by greatly increased size of the flowers.

CLARKIA.

The clarkia is one of the prettiest hardy native annuals that comes to us from beyond the Rocky Mountains. It blooms freely, which characteristic, taken in connection with the variety and brightness of its flowers, makes a bed of them in full bloom an attractive sight. They are useful, too, for hanging baskets, for vases, as edging plants, for low massing, or for borders.

The seeds should be sown outdoors in early spring and the plants grown in partial shade. The clarkias thrive in a warm, light soil, and their period of bloom is midsummer and late autumn. The average height of the plant is $1\frac{1}{2}$ feet.



FIG. 19.—Clarkia.

COBÆA SCANDENS.

Cobæa scandens is a rapid-growing, climbing vine which is easily propagated from seed. The dark color and refined character of its foliage, together with its bell-shaped flowers, render it a very satisfactory vine for covering broad areas. It is a less rampant grower than the moonflower, but furnishes quite as satisfactory a screen made up of much finer leaves. The flowers are not conspicuous, because of their modest colors and because they are hidden by the foliage. Their form, however, is pleasing and they are open during the day.

For success in the climate of Washington, D. C., seeds of the *Cobæa scandens* should be sown about March 15 in a rich compost. When the young seedlings have developed their first true leaves they should be transferred to 3-inch pots or to tomato cans and kept growing slowly until danger of frost is past. In the open, a rich border should be provided, for as soon as hot weather comes on the plants grow very rapidly if ample food is at their command. A rabbit-netting trellis or support is more satisfactory than cords or smooth wire for this plant, as it fastens itself chiefly by tendrils rather than by twining, as does the morning-glory.

FIG. 20.—*Cobæa scandens*.**COCKSCOMB (*Celosia cristata*).**

The cockscombs are prized and planted as an odd and picturesque decorative feature of the garden. The dwarf varieties make novel and attractive borders; the tall ones form striking groups, and when interspersed with other lower-growing plants in a border they produce a pleasing contrast. There are both red and yellow forms of the cockscomb, but the bright red and crimson varieties are most effective in gardens and also in winter bouquets, for which they are cut before fully ripe and dried in the house. The young plants can be grown from seeds sown in gentle heat in April and transplanted to the open ground the middle or last of May, or the seeds may be



FIG. 21.—Cockscomb.

sown early in May in the open where the plants are to stand. Transplanting into rich soil about the time the combs begin to form makes the flower-heads much larger. They are bright from midsummer until frost.

COLUMBINE (Aquilegia).

The columbine is a hardy perennial, with many horticultural varieties, and is a desirable border plant. Its habit of growth is to form large clumps. It blooms profusely early in the season and remains in bloom for a considerable period. It is quite hardy, and is useful for cutting. The peculiar pendant flowers are interesting in themselves because of their unusual form, and this feature, taken in connection with the graceful habit of the plant, gives each clump of columbine a striking and interesting appearance.



FIG. 22.—Columbine.

Sow the seed in the open ground in spring, preferably where the plants are to grow, and thin the young seedlings to about a foot apart. Seeds may also be sown in the autumn for flowering the following season. The plants thrive well under good garden culture, but such rare sorts as *Aquilegia cœrulea* and *A. chrysantha* do best in partially shaded, well-drained nooks. Few hardy perennials are so easily grown from seed.

CONE-FLOWER (Rudbeckia).

Many of the rudbeckias are hardy and perennial, but they may be treated as annuals. The flowers are quite showy and usually have yellow rays, though some are crimson and others more or less covered with brown toward the base. The rudbeckias are of very easy cultivation, thriving in almost any soil and climate. Most of them prefer a moist soil, but will thrive in the garden under ordinary cultivation. *Rudbeckia hirta*—the Black-eyed Susans, or “nigger-heads,” as they are sometimes called—will thrive in the hottest and driest situations. *Rudbeckia triloba*, a biennial, perpetuates itself through self-sown plants. The *triloba* may be used quite effectively as a border to a large bed of delphiniums or as a screen, as it forms a dense bush between 3 and 4 feet high. The rudbeckias are propagated by means of seeds or cuttings, or by division. The Golden Glow, one of the most satisfactory plants of this group, is well adapted for planting in a shrubbery or herbaceous



FIG. 23.—Cone-flower.

border. It grows to a height of from 3 to 4 feet, and may be used as a screen when lower-growing plants are placed in the foreground.

COREOPSIS. (See CALLIOPSIS.)

CORN-FLOWER (*Centaurea*).

Centaurea cyanus is also known as "blue bottle," "ragged sailor," "kaiser blumen," and sometimes as "bachelor's button." These bright-flowered plants are of a hardy nature, requiring simple culture, yet they are among the most attractive and graceful of all the old-fashioned flowers. When placed in water after cutting, the flowers increase in size. Seed of the annual sorts should be sown in the open in April or May and the young plants thinned to 4 to 6 inches apart. They thrive well on all moderately rich garden soils. The perennials may be grown from seeds sown in gentle heat in March and planted out in May or June.



FIG. 24.—Corn-flower.

COSMOS.

Cosmos is now one of the notable fall flowers. It is a strong, tall-growing annual, yet its bright, bold flowers have a daintiness and airiness which is heightened in effect by the feathery green foliage. It is most effective when planted in broad masses or long background



FIG. 25.—Cosmos.

borders against evergreens or fences at some distance from the house and the garden walks. From seed started in the house in March or April the plants will have reached 3 or 4 feet in height by September. The bright-colored, daisy-like flowers are borne in great profusion and come at a season when they are very acceptable. Because of the robust habit of the plant the young seedlings should be thinned to 18 inches apart when grown on moderately good soil. Sowing the seed late and in poor soil will dwarf the plants. In the latitude of Washington, D. C., the plants perpetuate themselves from self-sown seed. These volunteer plants can be taken advantage of for early bloom.

CYPRESS VINE. (See **IPOMCEA.**)

DELPHINIUM. (See **LARKSPUR.**)

DIANTHUS. (See **PINKS.**)

DIGITALIS. (See **FOXGLOVE.**)

ESCHSCHOLTZIA. (See **CALIFORNIA POPPY.**)

EVENING PRIMROSE (Godetia).

The evening primroses are choice, free-blooming annuals, with widely opened flowers of satiny texture, with delicate colors. They

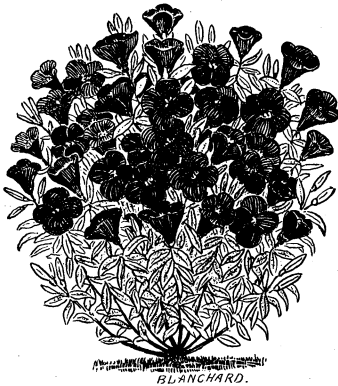


Fig. 26.—Evening primrose.

are suited for solid beds, border lines, for pots, and to grow in shrubby borders in shaded places, where few other flowers will flourish. The seed should be sown in an open border or in a cold frame in spring. If the latter, the seedlings should be transplanted to stand about a foot apart in rather thin or sandy soil. These plants are also successfully treated as biennials by sowing the seed in July and transplanting the young plants to a cold frame, to be placed in the open the following May. The blooming season is from early spring until frost,

and the average height of the plants is $1\frac{1}{2}$ feet.

FORGET-ME-NOT (Myosotis).

The dainty little flowers commonly known as forget-me-nots are hardy perennials that love cool, moist soils, and, like pansies, bloom most freely in fall and early spring. They make a satisfactory close border, the beauty of which is heightened by abundant bloom. The forget-me-not is also satisfactory as a winter-blooming plant for growing in cool rooms or cold frames. Another feature characteristic of this plant is that, after once having been introduced into a garden, it perpetuates itself from year to year by self-seeding like the poppy, portulaca, and several of the other desirable annuals. Sow the seeds in spring in a warm, sunny border. Most varieties bloom freely the first season and profusely the second year. The average height of the plant is 6 inches.

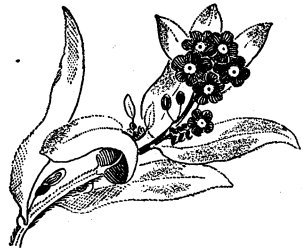


Fig. 27.—Forget-me-not.

FOUR-O'CLOCK (*Mirabilis jalapa*).

The mirabilis, sometimes called the "Marvel of Peru," is normally a perennial in its native region, the warmer parts of America, but under garden culture it gives satisfactory results when treated as an annual. The seed may be sown in the early spring under glass and the plants set out in May. The four-o'clock is often used as a screen with good results. The colored part of the flower, which is white, various shades of red, and striped, is the calyx, drawn out in the semblance of a corolla and surrounded at the base by a leafy involucre. In some cases, as in *Mirabilis jalapa*, only one flower is borne on an involucre.

The plant is a quick-growing, erect, bushy herb, attaining to a height of from 2 to 3 feet. Its blooming period is during the late summer and autumn. Because of its habit of opening its flowers only late in the afternoon and on cloudy days the popular name, four-o'clock, has been given. While this plant is a tender annual in the northern part of the United States, it frequently reproduces itself from self-sown seed, and even as far north as New York City it frequently manifests its perennial habit of developing tuberous roots sufficiently large to be lifted and stored like those of the canna.



FIG. 28.—Four-o'clock.

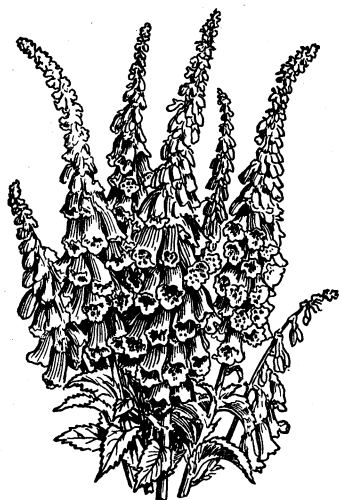


FIG. 29.—Foxglove.

FOXGLOVE (*Digitalis*).

The tall flower-stems of the foxgloves are particularly attractive when seen growing among shrubbery or in bold masses along walks or drives. As a background for lower-growing plants the foxgloves are also very useful and interesting. The spikes are frequently a foot or more in length and thickly strung with many showy, thimble-shaped flowers. Some of the new sorts rival gloxinias in shadings and markings.

Plants may be grown from seeds sown in the open in May and the seedlings transplanted where they are to grow in the open or, preferably, to a cold frame, where they make extra-strong plants that will flower

profusely the next season. They are most satisfactory when treated as biennials, sowing the seed every year in rich, deep soil and partial shade. The average height of the plants is from 2 to 3 feet. When the center spike begins to fade it should be cut out and the side shoots will, in consequence, grow more vigorously.

GAILLARDIA.

In the gaillardias are found both annual and perennial plants offering a wide selection of varieties and a profusion of bloom over a long period. The blooming period begins early and continues late in autumn. They are well adapted to mixed borders and are very satisfactory as cut flowers. The stems are of good length, carry the flowers well, and keep fresh as cut flowers for a long time when placed in water.



FIG. 30.—Gaillardia.

The annual gaillardias are all propagated readily from seeds sown in the open, but earlier flowers will be secured by sowing seeds in a hotbed and transplanting the plants to the open as soon as killing frosts have passed. In either case the blooming plants should not stand closer than 10 or 12 inches. They grow and bloom best when fully exposed to sun and air, and when planted on a

fertile but light and well drained soil.

GODETIA. (See **EVENING PRIMROSE.**)

HELIANTHUS. (See **SUNFLOWER.**)

HOLLYHOCK (*Althæa rosea*).

These too frequently neglected old-fashioned perennials are most pleasing and attractive when seen in groups or long rows against ever-green hedges or shrubbery as a background, and, in turn, form a very satisfactory background setting for plants of lower growth. The color variety in these plants is very great, ranging from pure white through almost every conceivable shade of yellow, red, and rose to ashen-gray and almost black. Although hollyhocks are permanent and hardy, even during the first winter, it is advisable to make seed sowings every year, as the flowers on young, vigorous plants are much finer than those upon old ones. Seed sowings should be made in April or May, and not later than June, to flower the next year. In the final

transplanting each seedling should be given a foot or more space each way to allow for full development. The average height of the hollyhock is 4 feet; many sorts, however, are much shorter, while an equal number are taller than the average above stated.

IPOMCEA (Morning-glory, Moonflower, and Cypress Vine).

The plants included under the names morning-glory, moonflower, and cypress vine, while all classed together botanically, are quite varied in form of flower and foliage. Their chief merit rests in the fact of their rapid growth and ability to cover large spaces in a short time. The shoots grow long and are well provided with foliage, two factors which adapt them well for temporary uses, such as covering structures and summerhouses, and for immediate effect upon new buildings. All three of the above-named types grow readily from seed, the morning-glory and cypress vine both giving good returns from seeds sown in rich borders about corn-planting time. The moonflower can be propagated either from seeds sown in a hotbed about the first of March in the climate of Washington, or from cuttings carried over winter in a greenhouse. For best success with the Imperial Japanese morning-glories and the moonflowers the seeds should be filed to make a slight aperture in the hard, horny covering, or they should be soaked for several hours in warm water. If these precautions are not observed a poor stand will usually be the result. Both these groups profit by being started in a hotbed or greenhouse in March or April, and are then transplanted to the open only after all danger of frost has passed.

Morning-glory.

The Imperial morning-glory is the most varied and most beautiful of the group. One of its interesting features is the variety of its

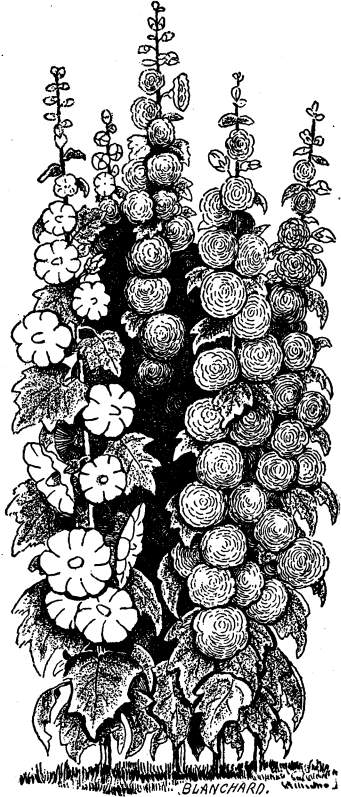


FIG. 31.—Hollyhock.

flowers and leaves. The latter differ greatly in shape, as well as in size; some are plain green, while others are oddly marbled and blotched with white or yellow. The colors and markings of the flowers vary from pure white to rose, crimson, and carmine through blues and purples of every shade to almost black. There are velvety single self-colors, a few doubles and semidoubles, others with quilled or feathered petals, many fancifully bordered, blotched, striped, penciled, and marbled—hardly any two plants from a seed packet seeming alike. The vines are vigorous, growing rapidly to a height of 30 or 40 feet. In sowing or planting they should be allowed about twice as much space as the ordinary morning-glory, and in the open should not be sown quite as early in the year.



FIG. 32.—*Ipomoea*: Morning-glory.

Moonflower.

The moonflowers (*Ipomoea bona-nox*) are the most vigorous in growth of any subdivisions of the genus included in the above list. The leaves are large, frequently 5 or 6 inches across, and the large white flowers, which open soon after sundown, are frequently 4 to 6 inches across. These plants with good soil conditions and plenty of moisture will make a growth of from 40 to 50 feet during the season.

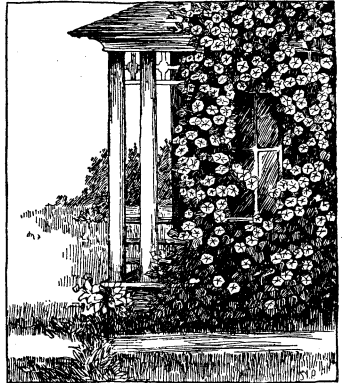


FIG. 33.—*Ipomoea*: Moonflower.

Cypress vine.

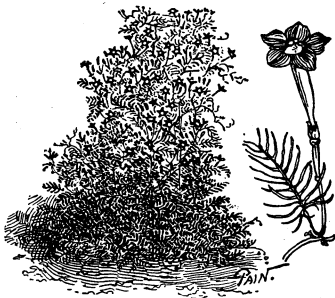


FIG. 34.—*Ipomoea*: Cypress vine.

The cypress vine (*Ipomoea quamoclit*) is very distinct both in foliage and flower from the moonflower and the morning-glories. The flowers are small, star-shaped, and usually pink in color; they are feather-like both in form and delicacy. The leaflets being fine, the general appearance of the plant is light and airy. While the plant does not grow as robustly as those named above, it is well adapted

for covering low screens and arbors. It grows readily from seed, which should be sown in a rich border rather thickly, about corn-planting time, and the young plants thinned to stand 4 to 6 inches apart in the row.

LARKSPUR (Delphinium).

Blue is a comparatively rare color among our cultivated plants, and for that reason the delphinium, which shows this color in great variety, is particularly valuable. The brilliant flower-spikes can be seen from a distance and are strikingly effective in beds or masses, in borders, shrubberies, or in combination with white lilies or other plants where a high contrast is desirable. The tall sorts should be planted among shrubbery or used as a background for other low-growing plants whose bloom will produce a pleasing contrast with the larkspur. The dwarf types are better suited for bedding and for low borders. Improvements are continually being made in the size of the flowers, as well as in the length and fullness of the spikes. Some of the species flower both early and late, and the season for all can be prolonged by care in cutting away withered flower-stems as fast as they appear. The delphinium is sometimes increased by division, but like most other plants they are more robust when grown from seed. This plant is easily propagated and adapts itself to many conditions, but in a soil deeply dug and well enriched with fine old manure their blooms are largest and best. For best results the plants must have ample room to grow; $1\frac{1}{2}$ to 2 feet each way is not too much for the taller sorts.

Annual varieties.—These include the rocket and hyacinth-flowered larkspurs, so called from their long, narrow flower spikes. They bloom best in a rather cool, moist soil. The seed may be sown in the open border, either in spring or fall, preferably the latter, so that germination may take place very early in spring. As the seedlings grow, thin them to stand 6 to 18 inches apart, according to variety. The shades of color include light, dark, and azure blue, white, buff, rose, apple blossom, pink, brick red, red lilac, dark lilac, violet, and fawn. The varieties are seldom kept separate, as they are quite as pretty and convenient for cutting when sown in mixture. Some of these are really hardy biennials, but because they bloom the first season they are treated as hardy annuals.

Perennial varieties.—These are usually taller than the annuals, requiring more space between the plants. If sown in the autumn or very early in spring many will bloom the first season. The foliage is clean and attractive and the habit of growth strong, producing long flower-spikes.



FIG. 35.—Larkspur.

LOBELIA.

The *Erinus* varieties (*lobelias*) are charming little plants that bloom very quickly from the seed and continue gay with flowers all through the season. For beds, edgings, baskets, and pots there is nothing prettier; their clear colors and generous bloom make them welcome anywhere.

FIG. 36.—*Lobelia*.

The seeds may be sown outdoors in early spring where the plants are to grow. As the plants appear they should be thinned moderately, or transplanted several inches apart in rich, open soil. Liquid manure given while they are in bloom greatly improves the flowers.

Many sorts are also good winter conservatory plants of trailing habit. The perennial or tall varieties are handsome, showy plants, found quite effective for backgrounds and grouping.

MARIGOLD (*Tagetes*).

There are two distinct types of garden marigolds, each with numerous horticultural varieties, derived from two distinct species.

The French marigold, which is the most compact and regular in growth, and consequently the most valuable as a bedding or a border plant, has been developed from *Tagetes patula*, while the African marigold, which is of a more spreading and open habit of growth and therefore less suited for bedding purposes, but well adapted for herbaceous or shrubbery borders, has been developed from *Tagetes erecta*. The common names of these plants give no clew to their nativity, both being tropical American plants, in spite of common names to the contrary.

The French marigolds are all useful bedding plants. The habit of growth is erect and compact, with good foliage.

The flowers are well formed, bright in color, and occur from June until frost. While these plants can be grown and successfully brought into bloom from seeds sown in the open in April in the latitude of Washington, such plants do not give as early bloom or the profusion of bloom which will be borne by plants started in a house and shifted for a time into pots which confine the roots of the plant and check it, so that when set in the open the increased food supply has a tendency to induce the



FIG. 37.—Marigold.

development of flowers rather than wood, a tendency which is maintained, much to the gratification of the gardener, throughout the season. When transferred to the open the plants should be set at least a foot apart each way. The same distance should also be given plants grown from seed sown in the open. There are both double and single forms of the French marigold. The named varieties are especially good, but very satisfactory results are obtained from mixed seeds.

The African marigolds frequently grow two or more feet in height, and for this reason are better suited for planting in mixed borders or along belts of trees and shrubs than in beds or masses in small areas. This is, however, the common marigold of the garden in America. The leaves and flowers are strong scented. The range of color in the flowers of this type of marigold is from sulphur yellow to orange, the darker shades being more commonly met with than the lighter ones.

MIGNONETTE (*Reseda*).

Every indoor or outdoor garden must have mignonette in plentiful supply. The seed can be sown at any time, and if successive plantings are made, its fragrant, modest-colored flowers may be gathered outdoors until November. For early bloom in the open, sow seed in pots or boxes under glass in February or March and thin or pot off the seedlings, to make stocky plants for bedding out, as soon as severe frosts are past. To insure a succession of bloom throughout the season, sow a row or two at a time in the open about April 15 in the vicinity of New York, and earlier southward, repeating regularly at intervals of about three weeks till August. The July sowing will make good winter-flowering plants. The average height of mignonettes is 1 foot.



FIG. 38.—Mignonette.

MOONFLOWER. (See *IPOMŒA*.)

MORNING-GLORY. (See *IPOMŒA*.)

NASTURTIUMS.

A wide range of colors has been developed in this favorite flower, the nasturtium, which for three or four months of the season makes a better display than almost any other plant. No other annual will produce such a profusion of flowers for so long a time with the same outlay of time and labor. The maximum of bloom is produced on thin soils, and the plant never flags through the hottest weather; in fact,

too much rain or moisture greatly reduces the supply of flowers. In soils too rich the leaves predominate and the plants are apt to rot off in wet weather, especially if standing too close. The seeds should be planted an inch deep, and the seedlings thinned to 10 or 12 inches apart. The rows for bedding varieties should not be less than a foot apart, and for tall varieties 4 feet.

Dwarf or Tom Thumb nasturtiums (*Tropæolum minus*).—These plants



FIG. 39.—Nasturtium.

have a neat, compact habit of growth and attractive foliage, and are not infested by insects. Blossoms appear in two months from the date of seed sowing, and continue throughout the whole season. A bed of dwarf nasturtiums in full bloom is a sea of color. It is said that a good bed, 6 by 20 feet in size, will yield about 1,000 flowers per day. The average height of the dwarf variety is 9 inches.

Tall or climbing nasturtiums (*Tropæolum majus*).—Besides their ordinary garden use for trailing over fences, trellises, stone walls, etc., the climbing nasturtiums can also be grown as pot plants for winter-flowering as screens, or as trailers for hanging baskets and vases. Sow plenty of seed in drills, and thin to 6 inches apart in the row. Like the dwarf forms, these plants bloom most quickly and profusely in poor soil. Their flowers are usually a little larger than those of the dwarf sorts. The average height of the plant is 5 feet.

NEMOPHILA.

The representatives of the genus *Nemophila* are dwarf, compact-growing, hardy, annual herbs, which produce an abundance of showy bell-shaped flowers from early spring to late autumn, for which reason they are esteemed for borders and for bedding purposes. All the species may be propagated from seed. If the seeds are sown in the open about the middle of August and then transplanted in late autumn very early flowers may be obtained. For summer and late fall blooms the seed may be sown in the open in April and not transplanted. The *nemophilas* love a moist loam, with partial shade, and produce an abundance of showy flowers, which are very valuable for bedding and for cut flowers. The whole plant is more or less hairy.



FIG. 40.—Nemophila.

PANSY (*Viola tricolor*).

The pansy, sometimes called heart's-ease, is a favorite with almost everyone. It is a plant that demands more than ordinary attention, but none repays such attention more liberally. For very early outdoor bedding the seed is sown in the autumn—September—in a cold frame, or in rich, moist garden beds, from which the plants can be transferred to a cold frame, setting them 2 or 3 inches apart each way before severe winter weather begins. In spring three-fourths of them can be lifted out for bedding, and the rest left to bloom in the frame. For winter bloom in a frame, set the plants about twice as far apart, and thin out half of them in spring. Cover the blooming plants with sash, adding a covering of matting or straw in very cold weather. In mild weather remove the mats and tilt the sashes to admit light and fresh air and to prevent the plants from becoming drawn. In outdoor beds raised a few inches above the ground, with a mulch of dry leaves and some brush to hold them in place, pansies will often winter nicely and bloom until midsummer, when a relay of young, vigorous plants should be ready to replace them.



FIG. 41.—Pansy.

Spring sowings should be made early, so as to secure good flowers during the early rains. Seed sown in a cool, moist place in June and July, and well tended, will give good flowering plants for fall. If they come into bloom in the heat of summer the flowers may be small at first, but as the weather becomes cooler they will increase in size and beauty. Through summer heat the flowers are finer in a somewhat shaded place, but in almost any situation good pansy seed will give fine flowers in spring and fall. Early fall sowings give the finest spring flowers.

PETUNIA.

Because of the ease and facility with which all of the single-flowered varieties of the petunia can be grown from seed this plant commands attention as a worthy candidate for the summer flower garden. The young plants grow rapidly and come into bloom early, and in addition to this they furnish a continuous wealth of blossoms until destroyed by frost. The large-flowered strains are very beautiful and of great variety. While the single sorts are common and inexpensive,

the double giant-flowered varieties are rendered expensive because they must be reproduced from seed which sets only after careful hand pollination of the flowers, which is in itself an expensive operation, or from cuttings, of which an individual plant can supply but a limited number.

For best results the seeds of all sorts should be sown in a gentle hotbed, cold frame, or in fine soil in a box placed in a sunny window in March or early in April for localities north of Washington, D. C. When the soil has warmed sufficiently and the danger of frost has passed, the seedling plants should be transplanted to a rich garden loam and placed about a foot apart each way. The seed of the double varieties is less vigorous than that of the single sorts and therefore requires more attention to prevent extremes of temperature and of moisture to insure good germination. If the seeds are sown in boxes in the living room, a pane of glass may with advantage be kept over the top to maintain a close atmosphere, and thus prevent the loss of moisture until the young plants are well out of



FIG. 42.—Petunia.

the ground. In planting, the seeds should be scattered over the surface of the soil and brought in contact with it by firming. They should not, like most other seeds, be covered.

Petunias are attractive in beds and masses, serve well for broad borders or bands, and thrive well in window boxes. They are not exacting as regards soil conditions, thriving well in almost any arable soil, and they endure drought well and bloom profusely.

PHLOX (*Phlox drummondii*).

The annual phlox, sometimes called flame flower, is particularly useful and attractive when sown in masses or ribbon beds of contrasting colors. Few annual plants are more easily grown from seed, give a quicker return of bloom, or offer such a variety to choose from as do the phloxes. There are few desirable colors beyond their range, and if given good soil and plenty of water they furnish a supply of



FIG. 43.—Phlox.

delicate flowers for cutting throughout the season. The phloxes are also useful as window-garden plants, and may be used as an undergrowth for tall, bare-stemmed plants. The first sowing of seed should be made as soon as the frost is out of the ground in the spring; later ones in May, either where the plants are to bloom or in a seed bed, as the phlox transplants readily. In transplanting set the taller kinds about a foot apart; if planted too thickly they suffer from mildew. The removal of flowers and seed-pods makes the plants more bushy and compact and lengthens their blooming period. The average height of the plant is about a foot.

PINKS (*Dianthus*).

The large and varied genus of *Dianthus* contains some of our most beautiful and most profitable flowers. The most of them are hardy perennials that bloom freely the first season, the plants remaining green all winter and blossoming the next year also if lightly protected by a mulch of straw, cut fodder, or leaves. Old plants flower the earliest, but as young ones give the largest, finest flowers, sowings are made every year. Seed can be sown under glass or in an open sheltered bed in March. The seedlings are easily transplanted and should stand 8 to 12 inches apart; dwarf ones, about 6 inches. If especially large, brilliant flowers are desired, a bed of well-mixed turfy loam, leaf-mold, and well decayed manure should be prepared for them. Good drainage should be provided, as the plants are impatient of too much moisture and are more liable to winter-kill in moist than in well-drained situations. In fact, the plant is hardy to severe cold, but succumbs when exposed to low temperatures in wet places.

The carnation pink.

This plant, *Dianthus caryophyllus*, which is the forcing carnation of the American florist, can be grown from seeds sown early in the season in hotbeds, the young plants being given frequent shifts to pots of increased size as they grow until all danger of frost is past and the growing season is well on, when they may be transferred to the border where they are to bloom. If they are given a rich soil and an abundance of moisture, the bloom will more than repay the extra trouble taken. Seedling plants are more variable in character



FIG. 44.—Carnation pink.

than plants propagated from cuttings, and for that reason are not well suited for commercial purposes.

On the continent of Europe this type of dianthus is more commonly used as a garden annual than in America. The form known as "Marguerite carnation," which has recently come into popular favor, is well adapted to cultivation as an annual. The majority of its flowers come double, and it has a pleasing habit of growth.

Sweet william.

The sweet william, *Dianthus barbatus*, which is to be found in every grandmother's garden, is one of the most satisfactory members of this group for annual planting. While seed can be sown in the open early in the season, about corn-planting time, the best results in the way of early bloom come from plants produced from seeds sown in a hotbed not later than the 10th of March in the latitude of New York, the young plants being pricked out into flats or, preferably, into thumb pots, and later shifted to 3-inch pots before planting in the flowering border. The outside planting of hotbed-grown plants should be delayed until the season has advanced sufficiently to prevent the



FIG. 45.—Sweet william.

plants suffering from a check by cold after being placed in the open. The pot-grown plants should be set at least 10 inches apart and seedlings from seeds sown in the open had best be thinned to stand at least 8 inches apart.

The Scotch pink, or grass pink.

The Scotch pink, *Dianthus plumarius*, is a hardy dianthus, which, when treated as an annual in like manner as the sweet william, gives very satisfactory results. The delicately fringed, variously colored, fragrant flowers give the plant an odd yet attractive appearance.

The flowers of all the plants of this group are most satisfactory for bouquets and table decoration because of the length of time they will keep in a fresh and attractive condition after being cut and placed in water.



FIG. 46.—Scotch or grass pink.

POPPY (Papaver).

In the spring, even before the tulips are fairly gone, old gardens begin to be gay with poppies, which, in some one or other of their many forms, continue a procession of bright blooms until frost. No other plants possess so bold and brilliant a flower, coupled with the same grace of stem, airiness of poise, and delicacy of tissue as the poppy. For beds and borders, with a background of green, there is nothing which will produce a more striking contrast. Some sorts are admirable for naturalizing in open wooded grounds; others, like the Shirley, are beautiful for cutting. A sandy loam suits poppies best, and as their strong tap roots are difficult to transplant it is well to sow seed where the plants are to bloom. Seed sowings made in the autumn and at intervals in spring will provide a long succession of flowers. The seeds should be sown thinly and covered very lightly, as the seed is quite small. As soon as the young seedlings are well established thin the plants to stand about a foot apart. The plants which bloom most profusely are those grown from fall or early spring sowings while the earth is cool and moist.



FIG. 47.—Poppy.

PORTULACA.

This bright-flowered, thick-leaved annual (portulaca) is unrivaled for brilliancy among plants of low growth. It possesses the ability



FIG. 48.—Portulaca.

to flourish under extremely adverse conditions; even the hot sun and a light sandy soil, with sparse water supply, will not destroy it. It is satisfactory for beds, edgings, and rockwork, and for filling up irregular spaces or unexpected gaps in flower beds. As an undergrowth for taller plants it is also valuable. It flourishes, carpeting the ground with a mat of succulent foliage that in the forenoon is hidden by the gayest flowers. The plant is particularly useful in the Northwest. The seed does not germinate until hot weather, and should be sown late. Beyond the sowing, this plant requires little care. The hardy character of the plant is shown

by the fact that it can be transplanted while in full flower through the driest, hottest seasons. The average height of the portulaca is 6 inches.

At Washington and southward this plant will perpetuate itself by self-sown seeds. In some soils this is sufficient to cause the plant to assume a weedy character. It never becomes troublesome like its near relative, the weedy garden purslane, or "pusley" (*Portulaca obracea*.)

POT MARIGOLD. (See **CALENDULA**.)

RICINUS. (See **CASTOR BEAN**.)

RUDBECKIA. (See **CONE-FLOWER**.)

SALVIA. (See **SCARLET SAGE**.)

SCARLET SAGE (*Salvia*).

The *Salvia splendens*, or scarlet sage, is a standard bedding plant that keeps the garden bright with color until late in autumn. This plant lends itself to many uses; it makes a good pot plant, does well in window boxes, and is useful for cutting to give color. Its best use, however, is as a hedge or border plant where long broad bands of intense color are desirable.



FIG. 49.—Scarlet sage.

In the climate of Washington, D. C., seeds should be sown in window boxes or frames in March or April and the plants set outdoors during the latter part of May, or the seed may be sown outdoors after the first of June if protected from heavy rains and strong winds. The plants grow and bloom profusely in any light, rich soil. Both the tender and

hardy perennial sorts bloom the first year and all are treated as annuals.

SCOTCH PINK. (See **PINKS**.)

SNAPDRAGON (*Antirrhinum*).

The snapdragon is a valuable border plant. It flowers the first year from seed sown as an annual. The bright color and peculiar form of the flowers always attract attention. The newer sorts offer variety of colors and of markings. The spikes are useful for cutting and keep fresh a long time. From seed sown in the open ground in May plants will bloom in July and August. For early flowers the seed should be sown under glass in February or March and transplanted into beds of warm, dry soil moderately enriched. If protected by a cold frame or even a mulch of leaves, the plants will winter well and bloom early the following year. The snapdragon, like most perennials and biennials which bloom the first year, and of which a particular display is desired, should be treated like an annual and sown every year. The plant blooms freely and continually until frost, its average height being $1\frac{1}{2}$ feet.



FIG. 50.—Snapdragon.

STOCKS (*Matthiola*).

The group of plants known as stocks offers many desirable qualities.



FIG. 51.—Stocks.

The plants are vigorous, have a good habit of growth, fragrant flowers in various colors, a long season of bloom, and are adapted to a wide range of cultural conditions. Stocks are suitable for bedding, edgings, pot culture, house or conservatory use, and for cutting. For bouquets and floral work the double white sorts are especially useful. To secure early flowers, seeds should be sown under glass in March or April, and the young seedlings transplanted when an inch high into other pots or boxes, or into the fine soil of a spent hotbed. Advantage should be taken of showery May weather to transfer the plants to garden beds or deep, rich soil, setting them about a foot apart each way. As with other plants, frequent transplantings during the early stages of growth tend to give them a more

dwarf and compact habit. For late flowers seed sowings may be made in the open ground in May. If plants that began to bloom late are

carefully lifted and potted in the fall they will flower freely during the winter in a house or room that is tolerably cool and moist. The blossoms are very lasting. The average height of the stocks is from 1 foot to $1\frac{1}{2}$ feet.

SUNFLOWER (*Helianthus*).

These tall-growing, bright-flowered annual plants have not received the attention they deserve. They have suffered the misfortune of having been cheapened by use as a burlesque. In reality, however, the tall-growing, large-flowered sorts, as well as the dwarf, many-flowered varieties, are useful when skillfully employed in mixed plantations with other herbaceous annuals. The golden yellow disks are like sunbursts among the shrubbery. The tall habit of the plant and the dense foliage of some varieties suit them well for backgrounds and screens. Their long stems and extraordinary lasting qualities make them of value as cut flowers.



FIG. 52.—Sunflower.

The seed should be planted in the open garden in spring, at about the same time that corn is planted, and the plants thinned to stand from 2 to 4 feet apart, according as the plant is dwarf or tall growing. There is wide variation in the height and habit of growth of the different varieties, which range from 2 to 10 feet in height, with from one to many flowers.

SWEET PEAS (*Lathyrus odoratus*).

The sweet pea during the last decade has been greatly modified and improved by careful selection and cultivation, the flowers being larger and more varied in color and marking than formerly. The result is that the sweet pea has come to be one of the most popular annual flowering plants. It repays well the attention given it. The flowers are well suited for bouquets, and lend themselves well to table decoration. While the climbing habit of the plant is such as to prevent its use in groups and borders, its height is not sufficient to allow its use as a cover or screen for a lattice. The most satisfactory method of growing it is in long rows provided with rabbit-netting wire, supported by strong anchor posts and intermediate stakes, to prevent the wire from sagging between its supports.



FIG. 53.—Sweet pea.

Sweet peas require a soil deeply tilled and well supplied with plant food. A satisfactory method is to open a trench about a foot wide and 10 inches deep in rich garden loam, in the bottom of which about 3 inches of well-rotted manure are placed, with 2 inches of fine top soil scattered immediately over it. Upon this bed sow the peas in double rows about 8 inches apart, the seeds being placed from half an inch to an inch apart in the row. Cover the seed about 3 inches deep, and after the young plants appear and have attained sufficient height fill the trench completely.

As the sweet pea can hardly be placed in the soil too early in the spring, all general preparatory work should be done in the autumn, and the seeds sown as early in March as practicable. In sections with a winter temperature less severe than that of Washington the best results will undoubtedly be obtained from fall sowing.

SWEET WILLIAM. (See **PINKS.**)

VERBENA.

The verbena is a low-growing annual, with a decumbent or creeping habit. The flowers are borne on terminal or lateral shoots, which lift themselves from 5 to 7 inches off the ground, and when grown in mass the plants will form a mat which in full bloom will give the soil the appearance of having a carpet of flowers. Because of the ability of the plant to form a compact growth and produce a wealth of flowers over a long period, the verbena is frequently used as a bedding plant where carpet bedding effects are desired. The contrasting colors in the varieties which come true from seed allow of securing pleasing combinations of colors which are effective where low-growing plants can be used. The length of stem and the texture of the flower are such that the verbena is of value for bouquets and table decorations. The verbena can be used with good effect in beds, borders, mounds, and in window boxes.



FIG. 54.—Verbena.

While the verbena grows readily from cuttings and from layers, seedling plants are more vigorous and as a rule produce better flowers. For the earliest bloom in the latitude of Washington, D. C., sow the seeds early in February in a moderately warm living room or greenhouse. For general outdoor planting the seeds may be sown about March 10, either in a living room, hotbed, or greenhouse. Soak the seed a few hours in tepid water and sow in seed-boxes filled with light,

rich soil; cover one-fourth of an inch deep, press down firmly, and water sparingly. When the seedlings are about an inch high transplant them into other boxes, placing the young plants 2 or 3 inches apart each way. If thumb pots are available use these in place of boxes. When planting-out time arrives choose a bright, sunny situation. Make the soil rich and compact rather than light, but in all cases provide good drainage. Set the young plants 10 to 15 inches apart each way and give good cultivation until they cover the ground. With such treatment the verbena should give continuous bloom from early summer until killed by frost.

ZINNIA (YOUTH-AND-OLD-AGE).

The zinnia is easily grown from seed sown in the open ground. When sown in April the plants will bloom abundantly and continuously

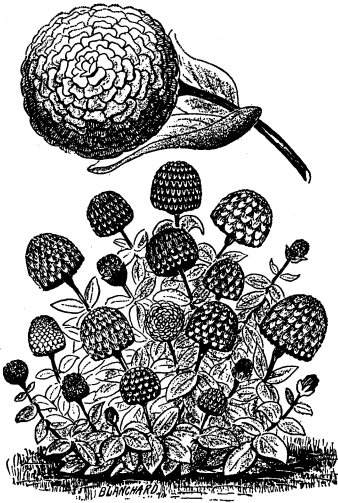


FIG. 55.—Zinnia.

through the entire season. Of late, great improvements have been wrought both in the color and form of the flower. During the month of August zinnias are at their best. To secure large flowers and a profusion of bloom the plants must be given ample room for full development, as well as an abundant supply of food. Strong, rich soils suit the zinnia. If the seeds are sown in a dwelling house or in a hotbed in March and the young plants are pricked out once or twice before being placed in their permanent situations more satisfactory results will be secured than from outdoor-sown seeds unless equal care in thinning or transplanting is given. The plants can be used for groups, beds, borders, garden lines, and summer hedges. Their average height is $1\frac{1}{2}$ feet.